

NON-PUBLIC?: N  
ACCESSION #: 8809280056  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Calvert Cliffs, Unit 1 PAGE: 1 OF 3

DOCKET NUMBER: 05000317

TITLE: Loss Of Load Due to Main Feed Regulating Valve Failure  
EVENT DATE: 08/24/88 LER #: 88-009-00 REPORT DATE: 09/24/88

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: M. D. Milbradt, Engineer TELEPHONE: 301-260-4352

COMPONENT FAILURE DESCRIPTION:  
CAUSE: B SYSTEM: SJ COMPONENT: FCV MANUFACTURER: F130  
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT: At 2332, August 24, 1988, Calvert Cliffs Unit 1 (100% power) tripped on Loss of Load when its Main Turbine tripped on high Steam Generator level. The Main Turbine tripped when the air line on #12 Main Feed Regulating Valve failed and the valve failed to the full open position causing a high level in #12 steam generator. The air line to the feed regulating valve failed due to vibration and stress.

#### Corrective Actions

1. Pressure switch 1-PS-1121 was relocated and mounted on a secure structure to minimize feed header vibration on the airline.
2. A walkdown was performed on selected components to identify and correct the location of component instrument air lines subject to excessive stress.
3. The tubing installation standard will be improved to provide detailed guidance on tubing configuration, support, bending, and connecting.
4. Upon development of adequate standards, an evaluation will be done of other air supply installations, the failure of which could lead to a trip.

End of Abstract

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### Description

At 2332, August 24, 1988, the Calvert Cliffs Unit 1 Main Turbine (EIIS TA-TRB) tripped when a high level setpoint was reached on #12 Steam Generator (SG). The Unit 1 Reactor, at 100% power, automatically tripped on loss of load. Prior to the trip, at approximately 2329, operators received a high feed flow alarm on #12 SG and noted an increasing level in #12 SG. The operators attempted to close #12 Main Feed Regulating Valve (MFRV) (EIIS SJ-FCV) and manually decrease the speed of #11 and #12 Steam Generator Feed Pumps (SGFP) (EIIS SJ-P) in an effort to reduce level in #12 SG. The MFRV was wide open and would not respond to manual control. Steam Generator level increased to the Main Turbine high level trip setpoint. While performing Emergency Operating Procedure (EOP-0) (Post Trip Immediate Action), operators noted level still increasing in #12 SG, so they tripped both SGFPs and shut #12 Main Steam Isolation Valve (MSIV) (EIIS SB-ISV). Narrow range level indication was off scale high for 18 seconds before decreasing but there was no indication of carry over into the steam line. The Reactor Protection System (RPS) (EIIS JC) trip logic was activated on a Loss of Load. The Auxiliary Feedwater System (AFWs) (EIIS JE) actuated but did not lock in, i.e., the auxiliary feedwater turbine driven pumps (EIIS CH-P) were not started due to an installed time delay. However, the motor driven auxiliary feedwater pump (No. 13) (EIIS CH-P) did start and was secured following verification of main feedwater flow. There was no automatic or manual Engineered Safety Features Actuation. The plant was brought to a safe shutdown condition. The #12 MFRV failed to the full open position due to a failed air line to the valve.

### Failure Information

One equipment failure, #12 MFRV, contributed to this event. The 1/4 inch instrument air line nipple at the junction of #12 MFRV's valve positioner sheared due to cyclic stress and fatigue. The improper location of a pressure switch (PS) (EIIS SJ-PS) in the instrument air supply line contributed to the total stress on the nipple. The weight of the PS along with feed header-induced vibrational stress eventually caused the nipple to fail; air pressure on the top and bottom of the valve diaphragm bled off simultaneously, and pressure beneath the valve plug from main feedwater forced it up, thus fully opening the valve. Normally, the valve will fail in the "as is" position if air pressure decreases to less than 70 psig as seen at the pressure switch. In this event the loss of air pressure was downstream of the pressure switch.

MFRV Manufacturer Fisher Model #475-ENA

### Cause

The Main Feed Regulating valves in conjunction with the Steam Generator Feed pumps, are used to control Steam Generator level. These valves are positioned via instrument air pressure derived from electrical control signals from the three element SG level control system. The SGFP speed signal receives its input from the MFRV differential pressure. When the instrument air line to #12 MFRV failed the MFRV went to the full open position. There was excessive feedwater flow with the MFRV fully open and the level in #12 SG started to increase. Operators reduced flow by manually ramping the SGFP's speed back but not before the SG level increased enough to actuate the high level trip. The event was caused by the failure of #12 MFRV (see diagram).

### Analysis

The loss of load event analyzed in Chapter 14.5 of the Final Safety Analysis Report (FSAR) assumes 100% power and a reactor trip on high pressurizer pressure 6.8 seconds after the Loss of Load. In this event, the reactor was at 100% power and tripped within one Milli-second on Loss of Load, Therefore, this event was less severe than and bounded by the accident described in the FSAR. No similar events at Calvert Cliffs have been reported.

### Corrective Actions

1. Pressure switch 1-PS-1121 was relocated and mounted on a secure structure to minimize feed header vibration on the airline.
2. A walkdown was performed on selected components to identify and correct the location of component instrument air lines subject to excessive stress.
3. The tubing installation standard will be improved to provide detailed guidance on tubing configuration, support, bending, and connecting.
4. Upon development of adequate standards, an evaluation will be done of other air supply installations, the failure of which could lead to a trip.

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FIGURE OMITTED - NOT KEYABLE

ATTACHMENT 2 TO 8809280056 PAGE 1 OF 1

BALTIMORE GAS & ELECTRIC

CHARLES CENTER P.O. BOX 1475 BALTIMORE, MARYLAND 21203

CALVERT CLIFFS NUCLEAR POWER PLANT DEPARTMENT  
CALVERT CLIFFS NUCLEAR POWER PLANT  
LUSBY, MARYLAND 20857

September 23, 1988

U.S. Nuclear Regulatory Commission Docket No. 50-317  
Document Control Desk License No. DPR 53  
Washington, D.C. 20555

Dear Sirs:

The attached LER 88-09 is being sent to you as required by 10 CFR 50.73. Should you have any questions regarding this report, we would be pleased to discuss them with you.

Very truly yours,

L.B. Russell

Manager  
Calvert Cliffs Nuclear Power Plant Department

LBR: MDM:imd

cc: William T. Russell  
Director, Office of Management Information  
and Program Control  
Messrs: J. A. Tiernan  
C. H. Cruse  
L. B. Russell

ACCESSION #: 8809280141

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